

CLAIMS

1. A bipolar, zero-gap type electrolytic cell for use in a filter press type electrolyzer having a plurality of bipolar electrolytic cells and a plurality of anodic ion exchange membranes each arranged between adjacent bipolar electrolytic cells, comprising:

an anode chamber;

an anode provided in the anode chamber, said anode being formed of an anode base material comprising one of a titanium expanded metal and a titanium wire netting with an open area percentage of 25% to 75%, said anode, after being applied with a catalyst on the anode base material, having a maximum height difference of 5 μm to 50 μm between irregularities on a surface thereof and a thickness of 0.7 mm to 2.0 mm;

a cathode chamber arranged back to back with the anode chamber; and

a cathode having at least two layers stacked in the cathode chamber, said layers including a conductive cushion mat layer and a layer of a hydrogen generating cathode, said hydrogen generating cathode layer being adjacent to the cushion mat layer and arranged in an area for contact with the anodic ion exchange membrane.

2. A bipolar, zero-gap type electrolytic cell according to claim 1, wherein said anode base material comprises the titanium expanded metal that is formed during the expansion and rolling process of a titanium

plate.

3. A bipolar, zero-gap type electrolytic cell according to claim 2, wherein the metal has a thickness after the expansion and rolling process of 95% to 105% of a plate thickness before the expansion process.

4. A bipolar, zero-gap type electrolytic cell according to any one of claims 1 to 3, wherein said hydrogen generating cathode is formed of a base material having a thickness of 0.05 mm to 0.5 mm and is selected from a group of a nickel wire netting, an expanded nickel metal and a punched, porous nickel plate, and said hydrogen generating cathode has an electrolytic catalyst coating layer formed thereon that has a thickness of 50 μm or less.

5. A bipolar, zero-gap type electrolytic cell according to claim 1, further comprising gas-liquid separation chambers, said gas-liquid separation chambers being respectively formed in non-current-carrying parts at the top of the anode and cathode chambers within the anode and cathode chambers, wherein at least one of a cylindrical duct and a baffle plate serve as an inner circulation path for an electrolyte that is provided between at least one partition wall portion of the anode and cathode chambers which form the associated electrode.

6. A bipolar, zero-gap type electrolytic cell according to claim 5, wherein said gas-liquid separation chambers are formed with partition plates

therein.